We claim:

1. A support-bound probe, comprising

a capture oligonucleotide sequence covalently attached to the surface of a solid support, and

a conjugate, comprising

a target moiety,

a pairing oligonucleotide sequence which specifically hybridizes to the surface-bound oligonucleotide sequence, and which is covalently attached to the target moiety, and

a crosslinking moiety covalently bound to the pairing oligonucleotide sequence and to either the surface-bound oligonucleotide sequence or the surface of the solid support.

2. The support-bound probe of claim 1, wherein the target moiety is covalently attached to the pairing oligonucleotide sequence through a linking moiety.

3. The support-bound probe of claim 2, wherein the linking moiety is ethylene glycol.

4. The support-bound probe of claim 1, wherein the target moiety is directly attached to the pairing oligonucleotide sequence to form a continuous oligonucleotide sequence.

5. The support-bound probe of claim 1, wherein the crosslinking moiety is psoralen.

6. The support-bound probe of claim 1, wherein the target moiety is a single-stranded or double-stranded nucleotide sequence.

7. The support-bound probe of claim 1, wherein the target moiety is a protein, peptide, or oligopeptide.

8. The support-bound probe of claim 1, wherein the target moiety is a small molecule.

9. The support-bound probe of claim 1, wherein the pairing oligonucleotide sequence comprises between 3 and 50 nucleotides.

10. The support-bound probe of claim 1, wherein the pairing oligonucleotide sequence comprises between 3 and 20 nucleotides.

11. The support-bound probe of claim 1, wherein the pairing oligonucleotide sequence comprises between 3 and 10 nucleotides.

12. A solid support bearing an array of support-bound probes of claim 1 on the surface thereof.

13. The solid support of claim 12, bearing at least 50 probes on the surface thereof.

14. The solid support of claim 12, bearing at least 100 probes on the surface thereof.

15. The solid support of claim 12, bearing at least 500 probes on the surface thereof.

16. The solid support of claim 12, bearing a probe density of between 1 - 12 x 10^{-11} moles per cm^2.

17. The solid support of claim 12, bearing a probe density between 2 - 6 x 10^{-11} moles per cm^2.

18. The solid support of claim 12, bearing a probe density between 3 - 4 x 10^{-11} moles per cm^2.

19. The solid support of claim 12, wherein the array comprises a library of target moieties.

20. A probe comprising

a target moiety,

an oligonucleotide sequence covalently attached to the target moiety, and

a crosslinking moiety covalently bound to the oligonucleotide sequence and capable of forming a covalent bond to a surface or to an oligonucleotide sequence under predetermined conditions.

21. The probe of claim 20, wherein the predetermined conditions are exposure to light.

22. A solid support having an array of surface-bound capture oligonucleotides, wherein each oligonucleotide is covalently bound to a crosslinking moiety capable of forming a covalent bond to an oligonucleotide sequence complementary to the oligonucleotide.

23. The solid support of claim 22, wherein the surface-bound capture oligonucleotides comprise between 3 and 50 nucleotides.

24. The solid support of claim 22, wherein the support is functionalized with multiple surface-bound capture oligonucleotides all having the same sequence.

25. The solid support of claim 22, wherein the support is functionalized with multiple surface-bound capture oligonucleotides having a variety of sequences localized to a defined location on the solid support.

26. The solid support of claim 22, wherein the support is functionalized with repeating units of clusters of surface-bound capture oligonucleotides having a variety of sequences localized to a variety of defined location on the solid support.

27. A method for linking a probe to a solid support comprising

providing a solid support having an array of surface-bound oligonucleotides,

hybridizing to a surface-bound oligonucleotide a probe comprising a pairing oligonucleotide sequence complementary to the surface-bound oligonucleotide sequence and a target moiety, and

forming a covalent bond between the pairing oligonucleotide sequence and either the surface-bound oligonucleotide or the solid support.

28. The method of claim 27, wherein forming a covalent bond includes forming a covalent bond between a crosslinking moiety on the pairing oligonucleotide sequence and the surface-bound oligonucleotide sequence.

29. The method of claim 27, wherein forming a covalent bond includes forming a covalent bond between a crosslinking moiety on the pairing oligonucleotide sequence and the surface.

30. The method of claim 27, wherein forming a covalent bond includes forming a covalent bond between a crosslinking moiety on the surface-bound oligonucleotide sequence and the pairing oligonucleotide sequence.

31. A conjugate primer comprising

a PCR primer,

an oligonucleotide sequence covalently attached to the PCR primer, and a crosslinking moiety covalently bound to the oligonucleotide sequence and capable of forming a covalent bond to a surface or to an oligonucleotide sequence under predetermined conditions.

32. The conjugate primer of claim 31, wherein the PCR primer is covalently attached to the oligonucleotide sequence through a linking moiety.

33. The conjugate primer of claim 32, wherein the linking moiety is ethylene glycol.

34. The conjugate primer of claim 31, wherein the crosslinking moiety is psoralen.

35. A method for forming a self-assembling array of a library of target moieties comprising

providing a solid support having an array of surface-bound capture oligonucleotides wherein each capture oligonucleotide having a unique sequence is localized at one or more defined positions on the solid support,

contacting the array of surface-bound capture oligonucleotides with a mixture of conjugates comprising a library of target moieties fused to pairing oligonucleotides with sequences complementary to the surface-bound capture oligonucleotides;

forming a covalent bond between the pairing oligonucleotide sequence and either the surface-bound capture oligonucleotide or the solid support.

36. The method of claim 35, wherein the solid support is functionalized with a library of capture oligonucleotides and is contacted with a complementary library of pairing oligonucleotides fused to a library of target moieties.

37. The method of claim 35, wherein the solid support is functionalized with repeating clusters of capture oligonucleotides with unique sequences,

wherein each cluster is contacted with a set of conjugates comprising pairing oligonucleotides capable of specifically hybridizing to each unique capture oligonucleotide sequence in the cluster, and

wherein each cluster is contacted with a different set of conjugates comprising different targeting moieties fused to a common set of pairing oligonucleotides.

38. The method of claim 35, wherein the cluster comprises from 2 to 1000 different capture oligonucleotides.

39. The method of claim 35, wherein the cluster comprises from 2 to 100 different capture oligonucleotides.

40. The method of claim 35, wherein the cluster comprises from 2 to 50 different capture oligonucleotides.

41. The method of claim 35, wherein the cluster comprises from 2 to 10 different capture oligonucleotides.

42. A method for producing a double stranded DNA sequence with a single stranded overhang comprising

contacting a target DNA sequence with a pair of oligonucleotide primers wherein one of the primers is covalently attached to a single stranded oligonucleotide through a linking moiety, and

amplifying the target DNA using PCR.

43. The method of claim 42, wherein the linking moiety is ethylene glycol.

44. The method of claim 42, wherein the single stranded oligonucleotide further comprises a covalently attached crosslinking moiety.

45. The method of claim 44, wherein the crosslinking moiety is psoralen.

46. The method of claim 42, wherein the single stranded oligonucleotide is attached to the PCR primer which is extended to produce the sense strand of the target DNA.

47. The method of claim 42, wherein the 3' end of the single stranded oligonucleotide is attached to the 5' end of the PCR primer which is extended to produce the sense strand of the target DNA.